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Corrections to Eikonal Approximation for Nuclear Scattering at Medium Energies¹ MICAH BUUCK, GERALD A. MILLER, University of Washington — Interpretation of the results of future experiments at the upcoming Facility for Rare Isotope Beams (FRIB) will require accurate modeling of low energy nucleusnucleus interactions. The Glauber theory is a very successful high-energy approach, but its accuracy suffers at some of the lower beam energies of experimental interest to FRIB. A prescription developed by Wallace that treats the Glauber approximation as the zeroth order term in an expansion around an eikonal propagator has the potential to extend the range of validity of the approximation to lower energies. Here we examine the properties of this expansion, and calculate the corrections for both simple potential scattering and for nuclear reactions involving halo nuclei. We find that the corrections improve the accuracy of Glauber theory, so that it can be used at energies as low as about 40 MeV per nucleon.

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